

WHAT IS CLAIMED IS:

1        1.     A method for enforcing a signaling-level policy on bearer-level session-  
2 mode messaging, comprising:  
3                initiating session-mode messaging involving a first communication device  
4 and one or more second communication devices;  
5                imposing a policy by a signaling-level session control element on at least  
6 the first communication device to establish a bearer-level binding between the first  
7 communication device and bearer-level relay;  
8                determining a state of the bearer-level binding, and providing the state of  
9 the bearer-level binding to the signaling-level session control element; and  
10                at the signaling-level session control element, allowing or disallowing the  
11 session-mode messaging based on the state of the bearer-level binding.

1        2.     The method of Claim 1, wherein imposing a policy comprises requiring the  
2 first communication device to include the bearer-level relay in a path of the session-mode  
3 messaging between the first communication device and the one or more second  
4 communication devices.

1        3.     The method of Claim 2, wherein the session-mode messaging is conducted  
2 using a Message Session Relay Protocol (MSRP) and the bearer-level relay comprises an  
3 MSRP relay, and further comprising the first communication device issuing an MSRP  
4 BIND message to the MSRP relay to establish the bearer-level binding between the first  
5 communication device and the MSRP relay.

1        4.     The method of Claim 3, further comprising updating the state of the bearer-  
2 level binding to indicate a binding confirmation if the MSRP relay receives the MSRP  
3 BIND message from the first communication device, wherein allowing or disallowing the  
4 session-mode messaging comprises the signaling-level session control element allowing  
5 the session-mode messaging where the state of the bearer-level binding indicates the  
6 binding confirmation.

1           5.     The method of Claim 4, wherein:  
2                 determining a state of the bearer-level binding comprises determining  
3     whether the state of the bearer-level binding has been updated to indicate a binding  
4     confirmation in response to the MSRP relay receiving the MSRP BIND message within a  
5     predetermined time; and  
6                 allowing or disallowing the session-mode messaging comprises the  
7     signaling-level session control element disallowing the session-mode messaging where the  
8     state of the bearer-level binding has not been updated to indicate the binding confirmation  
9     within the predetermined time.

1           6.     A method for enforcing signaling-level policies directed to bearer-level  
2     message sessions, comprising:  
3                 imposing at least one policy on a communication device anticipating  
4     participation in a message session, wherein the policy is initiated at a signaling-level  
5     element and includes a directive for the communication device to include an intermediary  
6     in a path of the message session;  
7                 determining whether the communication device has included the  
8     intermediary in the path of the message session;  
9                 notifying the signaling-level element if it is determined that the  
10    communication device has included the intermediary in the path of the message session;  
11    and  
12                 enabling the communication device to participate in the message session in  
13    response to the signaling-level element receiving the notification.

1           7.     The method of Claim 6, further comprising disallowing the communication  
2     device to participate in the message session if it is determined that the communication  
3     device has not included the intermediary in the path of the message session.

1           8.     The method of Claim 7, wherein determining whether the communication  
2     device has included the intermediary in the path of the message session comprises

3 determining whether the signaling-level element receives the notification within a  
4 predetermined time.

1 9. The method of Claim 6, wherein determining whether the communication  
2 device has included the intermediary in the path of the message session comprises  
3 determining whether the intermediary has received from the communication device a  
4 binding message identifying the intermediary.

1 10. The method of Claim 6, further comprising the communication device  
2 including the intermediary into the path of the message session by issuing a binding  
3 message to the intermediary to establish the intermediary as a portion of the path of the  
4 message session.

1 11. The method of Claim 10, wherein the message session is conducted using a  
2 Message Session Relay Protocol (MSRP) and the intermediary comprises an MSRP relay,  
3 and wherein issuing a binding message to the intermediary comprises issuing an MSRP  
4 BIND message from the communication device to the MSRP relay.

1 12. The method of Claim 6, wherein imposing at least one policy that is  
2 initiated at a signaling-level element comprises imposing the policy via a Serving-Call  
3 Session Control Function (S-CSCF) within an Internet Protocol (IP) Multimedia  
4 Subsystem (IMS).

1 13. The method of Claim 12, wherein imposing the policy via an S-CSCF  
2 within an IMS comprises sending the policy from the S-CSCF to the communication  
3 device via Session Initiation Protocol (SIP) signaling.

1 14. The method of Claim 6, wherein the message session is conducted using a  
2 Message Session Relay Protocol (MSRP) and the intermediary comprises an MSRP relay.

1           15. The method of Claim 14, further comprising sending an MSRP BIND  
2 message from the communication device to the MSRP relay to include the MSRP relay in  
3 the path of the message session.

1        16. The method of Claim 14, wherein the signaling-level element comprises a  
2        Serving-Call Session Control Function (S-CSCF) within an Internet Protocol (IP)  
3        Multimedia Subsystem (IMS), and wherein imposing at least one policy that is initiated at  
4        a signaling-level element comprises:

1           18. The method of Claim 17, wherein notifying the signaling-level element  
2 comprises notifying the S-CSCF by the PDF that the communication device has included  
3 the MSRP relay in the path of the message session and is authorized to participate in the  
4 message session.

1           19. The method of Claim 18, wherein notifying the S-CSCF by the PDF  
2   comprises notifying the S-CSCF via a Gq interface between the S-CSCF and the PDF.

1           20. The method of Claim 14, wherein the signaling-level element comprises a  
2 Serving-Call Session Control Function (S-CSCF) within an Internet Protocol (IP)

3        Multimedia Subsystem (IMS), and wherein the MSRP relay comprises an Application  
4        Server (AS).

1            21.        The method of Claim 20, further comprising the S-CSCF subscribing to one  
2        or more events at the AS, and wherein notifying the signaling-level element comprises  
3        providing a notification message from the AS to the S-CSCF if it is determined that the  
4        communication device has included the intermediary in the path of the message session.

1            22.        The method of Claim 21, wherein providing a notification message from the  
2        AS to the S-CSCF comprises providing a SIP NOTIFY message via an IMS Service  
3        Control (ISC) interface.

1            23.        A method for enforcing signaling-level policies directed to bearer-level  
2        message sessions, comprising:

3                        initiating at least one policy at a signaling level;  
4                        imposing the policy on a communication device anticipating involvement in  
5        a message session;

6                        determining at the bearer level whether the communication device has  
7        complied with the policy;

8                        notifying the signaling level if it is determined at the bearer level that the  
9        communication device has complied with the policy; and

10                      allowing the communication device to engage in the message session in  
11        response to receipt of the notification of policy compliance at the signaling level.

1            24.        The method of Claim 23, wherein initiating at least one policy at a signaling  
2        level comprises initiating a policy requiring the communication device to include an  
3        intermediary in a bearer-level path of the message session.

1            25.        A system for enforcing signaling-level policies in an IP Multimedia  
2        Subsystem (IMS) network, comprising:

3                   a first communication device capable of communicating signaling messages  
4   via the IMS network and participating in session-mode messaging via a bearer path;  
5                   a signaling-level proxy configured to impose at least one policy on the first  
6   communication device via the IMS network; wherein the policy requires the first  
7   communication device to include the intermediary into the bearer path of the session-mode  
8   messaging;  
9                   an intermediary configured to relay messages of the session-mode  
10   messaging between the communication device and one or more second communication  
11   devices, wherein the intermediary is configured to receive at least one binding message  
12   from the first communication device, and in response to provide compliance information  
13   indicating compliance of the policy by the first communication device; and  
14                   wherein the signaling-level proxy is configured to enable the session-mode  
15   messaging in response to the compliance information.

1           26.   The system as in Claim 25, wherein:  
2                   the signaling-level proxy comprises a Serving-Call Session Control  
3   Function (S-CSCF);  
4                   the session-mode messaging is conducted using a Message Session Relay  
5   Protocol (MSRP) via the bearer path; and  
6                   the intermediary comprises an MSRP relay.

1           27.   The system as in Claim 26, wherein the MSRP relay comprises an  
2   Multimedia Resource Function Processor (MRFP).

1           28.   The system as in Claim 26, wherein the first communication device  
2   comprises a processor configured to generate the binding message as an MSRP BIND  
3   message for transmission to the MSRP relay to include the MSRP relay into the bearer  
4   path for the session-mode messaging.

1           29.   The system as in Claim 28, further comprising a Policy Decision Function  
2   (PDF) logically coupled between the MSRP relay and the S-CSCF, wherein the MSRP

3 relay is configured to forward an authorization token received via the MSRP BIND  
4 message to the PDF, and wherein the PDF is configured to provide the compliance  
5 information to the S-CSCF in response to receiving the authorization token.

1 30. The system as in Claim 29, further comprising a Go interface between the  
2 MSRP relay and the PDF to communicate at least the authorization token.

1 31. The system as in Claim 29, further comprising a Gq interface between the  
2 PDF and the S-CSCF to communicate at least the compliance information.

1 32. The system as in Claim 28, wherein the MSRP relay comprises an  
2 Application Server (AS), and wherein the S-CSCF is configured to subscribe to an event  
3 package at the AS for notifications regarding the compliance information.

1 33. The system as in Claim 32, wherein the AS is configured to issue a  
2 notification to the subscribing S-CSCF via an IMS Service Control (ISC) interface in  
3 response to the MSRP relay receiving the MSRP BIND message.

1 34. The system as in Claim 33, wherein the AS comprises a Session Initiation  
2 Protocol (SIP) AS, and wherein:  
3 the S-CSCF is configured to subscribe to the event package using a SIP  
4 SUBSCRIBE method; and  
5 the SIP AS is configured to issue the notification to the subscribing S-CSCF  
6 using a SIP NOTIFY method.

1 35. One or more computer-readable mediums having instructions stored thereon  
2 that are executable by computing systems for enforcing a signaling-level policy on bearer-  
3 level session-mode messaging by performing steps comprising:  
4 imposing a policy by a signaling-level session control element on at least a  
5 first communication device to establish a bearer-level binding between the first  
6 communication device and bearer-level relay;

7                   determining a state of the bearer-level binding between the first  
8    communication device and the bearer-level relay; and  
9                   allowing or disallowing the first communication device to engage in a  
10   message session based on the state of the bearer-level binding.